

Kanitta Suttiboriban 2011: Estimating Soil Moisture Using Vegetation Indices in Cassava Field, Khon Buri District, Nakhon Ratchasima Province. Master of Science (Watershed and Environmental Management), Major Field: Watershed and Environmental Management, Department of Conservation. Thesis Advisor: Assistant Professor Somnimit Pukngam, Ph.D. 185 pages.

Estimating soil moisture using vegetation indices in cassava field, Khon Buri district, Nakhon Ratchasima province was conducted to study variations of soil moisture. The research employed two methods. The first method was gravimetric method which direct measurement and the second method was estimation of soil moisture by using remotely sensed data as vegetation indices. The experiment was done every other month during May 2009 to March 2010. Soil moisture verification was measured at 0-5 cm depth from the soil surface by frequency domain reflectometry (FDR). The objective of this study was variations of soil moisture in various of plant growth stages and using remotely sensed data from LANDSAT 5 TM implied vegetation indices related with soil moisture. There were 8 vegetation indices as follow: RVI, NDVI, TNDVI, IPVI, GNDVI, DVI, VI and NDWI. The results showed that the whole average of soil moisture was 15.07 percent by volume. Considering by plant growth state, the maximum soil moisture was 24.98 percent by volume in rooting stage and the minimum was 7.25 percent by volume in soil preparation stage. While estimating of soil moisture using remote sensing data with 8 parameters of vegetation indices derived by multiple regression analysis. The result found that the regression equation can be expressed as follow:

$$\text{All plant growth stage: } SM_{\text{All}} = 6.301 + 13.93\text{NDVI} - 10.62\text{VI} + 0.06\text{DVI} \quad (R^2 = 0.97)$$

$$\text{Wet period: } SM_{\text{Wet}} = 8.402 - 14.84\text{VI} + 13.9\text{NDVI} \quad (R^2 = 0.91)$$

$$\text{Dry period: } SM_{\text{Dry}} = 6.084 + 17.46\text{NDVI} + 0.08\text{DVI} - 10.66\text{NDWI} \quad (R^2 = 0.98)$$

When SM_{All} was soil moisture in all plant growth stage in unit of percent by volume.

SM_{Wet} was soil moisture in wet period in unit of percent by volume.

SM_{Dry} was soil moisture in dry period in unit of percent by volume.

NDVI was normalized difference vegetation index.

VI was vegetation index.

DVI was difference vegetation index.

NDWI was normalized difference water index.

Student's signature

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